REMARKS

Claims 1-28, 30 and 31 are currently pending in the subject application and are presently under consideration. Claims 1, 5, 9, 16 and 18 have been amended herein.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Objection to Claim 18

Claim 18 has been amended herein to properly set forth dependence from claim 17. Withdrawal of this objection is respectfully requested.

II. Rejection of Claims 1-28 and 30-31 Under 35 U.S.C. §102(e)

Claims 1-28 and 30-31 stand rejected under 35 U.S.C. §102(e) as being anticipated by Gjerdingen, *et al.* (U.S. 6,539,395). Applicants' representative respectfully request withdrawal of this rejection for at least the following reasons. Gjerdingen, *et al.* does not teach or disclose the present invention as recited in the subject claims.

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The subject invention generally relates to information management and in particular to a system and method for automatically classifying items. The invention provides meta-classifiers and systems and methods for building meta-classifiers, which are combinations of multiple classifiers. The meta-classifiers provide a determination or indication of whether an item belongs in a particular category *via* applying a probabilistic approach to combining evidence regarding correct classification of items. Thus, meta-classifiers in accordance with the invention take the form of probabilistic dependency models. Using a set of training data and machine learning techniques, the probabilistic dependency models are constructed to effectively utilize evidence that can include outputs of multiple classifiers. Additionally, the

probabilistic dependency models of the invention can consider additional evidence, such as one or more reliability indicators.

To the contrary, Gjerdingen *et al.* discloses "[a] method for creating a database that allows content based searching in the music domain." (Abstract). Gjerdingen *et al.* employs feature vectors which are employed to compare music samples. (Col. 3, 18-20). The feature vectors of Gjerdingen *et al.* can include a vocal quality vector, a sound quality vector, a situational quality vector, a genre vector, an ensemble vector and an instrument vector. (Col. 12, line 21 – col. 14, line 35). A modeling module analyzes acquired data and performs a similarity computation. (Col. 15, lines 6, 7). The similarity computation determines the optimum function that can represent similarity between different music samples, based upon defined music attributes (i.e. feature vector values). (Col. 15, lines 6-11).

A function Fij represents the distances between music sample i and j and may be illustrated as:

$$WgDg + WeDe + WvDv + WtDt + WiDi$$

where Wg, We, Wv, Wt and Wi are individual weights allocated to individual music spaces. (Col. 16, lines 26 – 32). The plural weights Wg, We, Wt and Wi are calculated such that S1 and Fij are at a minimum distance from each other. (Col. 16, lines 32- 34).

Function Fij may be fit using linear regression or by nonlinear regression techniques. (Co. 16, lines 39, 40). Other tools may be used to compute the weights shown and fit function Fij: Bayesian estimation techniques, neural network techniques, classification trees and hierarchical clustering. (Col. 16, line 45 – Col. 17, line 21).

With regard to classification trees, Gjerdingen *et al.* discloses "[c]lassification trees define a hierarchical or recursive partition of a set based on the values of a set of variables." (Col. 17, lines 40 – 42). "In the present case, the variables are the elements of plural feature vectors." (Col. 17, lines 42, 43). "A decision tree is a procedure for classifying music into categories according to their feature vector values." (Col. 17, lines 43 – 45). "Expert pairwise data 403A may be used to define a satisfactory decision tree and then the tree may be applied to a larger set of music." (Col. 17, lines 45 – 48). "This method partitions music samples into mutually exclusive categories, wherein music samples within each category are considered similar." (Col. 17, lines 48 – 50).

Independent claim 1

Independent claim 1 of the subject invention has been amended herein in accordance with the Examiner's comment that "applicant does not claim 'the combination of a plurality of classifiers to form the probabilistic classifier'". (Final Office Action at p. 5). As amended herein, independent claim 1 recites limitations of "***a plurality of classifiers; and, a computer system component comprising probabilistic dependency models ... wherein the probabilistic dependency models collectively employs outputs from the plurality of classifiers***".

Contrary to the Examiner's assertion, Gjerdingen *et al.* does not disclose combining the outputs of a plurality of classifiers to form a probabilistic dependency model as in applicants' claimed invention. Applicants' representative acknowledges that classifiers based on probabilistic dependency models include classifiers based on decision trees models, support vector machines, Bayesian belief networks, and neural networks (p. 1, lines 14-16). However, the disclosure of these classifiers in Gjerdingen *et al.* is limited to computation of weights and function fitting. Gjerdingen *et al.* does not teach or suggest a computer system for classifying items that includes probabilistic dependency models, one for each of a plurality of categories, the models applied to an item to provide with respect to each of the plurality of categories an indication of whether the item belongs, the models collectively employing outputs from a plurality of classifiers as set forth in independent claims 1.

Moreover with respect to dependent claim 2, the subject invention employs reliability indicators. "[R]eliability indicators are, in a broad sense, attributes of the items being classified." (p. 2, line 27). "These attributes can include characteristics of an item, source of an item, and meta-level outputs of classifiers applied to the item." (p. 2, lines 28, 29). "In general, a reliability indicator provides an indication of a classifier's reliability in classifying certain groups of items." (p. 2, line 29 – p. 3, line 1). Gjerdingen *et al.* does not teach or suggest employment of reliability indicators with regard to the combination of the plurality of classifiers as in applicants' claimed invention.

In view of at least the foregoing, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claim 1 (and claims 2, 3 and 4 which depend there from). Accordingly, this rejection should be

withdrawn.

Independent claims 5 and 9

Independent claims 5 and 9 have been amended herein in accordance with the Examiner's comment that "applicant does not claim 'the combination of a plurality of classifiers to form the probabilistic classifier'". (Final Office Action at p. 5). Independent claim 5, as amended herein, is directed to a computer system for classifying items and recites a limitation of "a plurality of classifiers; and, a computer system component that applies a probabilistic dependency model to classify an item, wherein the probabilistic dependency model contains dependencies on one or more classical outputs from a plurality of classifiers and ***dependencies on one or more reliability indicators***". (emphasis added).

Similarly, independent claim 9, as amended herein, is directed to a computer system and recites a limitation of "a plurality of classifiers; and, a first computer system component that learns, from training examples, probabilistic dependency models for classifying items ***according to one or more reliability indicators*** together with classical outputs from a plurality of classifiers". "[R]eliability indicators are, in a broad sense, attributes of the items being classified." (p. 2, line 27). "These attributes can include characteristics of an item, source of an item, and meta-level outputs of classifiers applied to the item." (p. 2, lines 28, 29). "In general, a reliability indicator provides an indication of a classifier's reliability in classifying certain groups of items." (p. 2, line 29 – p. 3, line 1).

As discussed previously, Gjerdingen *et al.* does not disclose combining outputs of a plurality of classifiers to form a probabilistic dependency model. Furthermore, Gjerdingen *et al.* does not disclose employment of reliability indicators with regard to the combination of the plurality of classifiers as in applicants' claimed invention.

In view of at least the above, it is respectfully submitted that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 5 and 9 (and claims 6, 7, 8, 10, 11, 12, 13 and 30 which depend there from). Accordingly, this rejection should be withdrawn.

Independent claim 14

Independent claim 14 is directed to a computer readable medium having computer

executable instructions for performing steps comprising "***implementing a plurality of classifiers*** adapted to receive and classify at least one item, the plurality of classifiers each generating a score related to classification of the at least one item; and for each of one or more categories, facilitating classification, selection, and/or utilization of the at least one item with a probabilistic dependency model that employs one or more of the scores and, in addition, ***one or more reliability indicators***". (emphasis added).

Applicants' representative respectfully submits that the Examiner's assertion that "[s]imply stated, application does not claim 'the combination of a plurality of classifiers to form the probabilistic classifier' nor 'employment of reliability indicators with regard to the combination of the plurality of classifiers.'" is incorrect. (Final Office Action at p. 6). The first limitation of independent claim 14 provides "***implementing a plurality of classifiers ... the plurality of classifiers each generating a score related to classification...***". The second limitation combines the score from the first limitation with by "***facilitating classification, selection and/or utilization of the at least one item with a probabilistic dependency model that employs one or more of the score and, in addition, one or more reliability indicators.***"

As noted *supra*, Gjerdingen *et al.* does not disclose implementation of a plurality of classifiers, the outputs employed by a probabilistic dependency model. Furthermore, Gjerdingen *et al.* does not disclose employment of reliability indicators with regard to the implementation of classifiers, the outputs employed by a probabilistic dependency model.

Independent claim 16

As amended herein, independent claim 16 of the subject invention is directed to a system for classifying items and recites a limitation of "means for determining a model that classifies the items based on a probabilistic approach that combines information about the items including ***one or more classical outputs of classifiers and one or more reliability indicators***". (emphasis added).

As discussed above, Gjerdingen *et al.* does not disclose combining the outputs of a plurality of classifiers to form a model. Furthermore, Gjerdingen *et al.* does not disclose employment of reliability indicators with regard to the combination of the plurality of classifiers. Thus, Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 16. Accordingly, this rejection should be withdrawn.

Independent claim 17

Independent claim 17 is directed to a computer-readable medium having stored thereon a data structure useful in classifying items and recites:

> first data fields containing data representing an attribute to test, wherein the attributes represented include both classical classifier outputs and reliability indicators;
>
> second data fields corresponding to the first data fields and containing data representing values against which to compare the attributes;
>
> third data fields containing data representing classifier outcomes;
>
> fourth data fields facilitating determination of relationships among instances of the first, second, and third data fields, the relationships having a decision tree structure with the first and second data fields corresponding to decision nodes and the third data fields corresponding to leaf nodes.

Gjerdingen *et al.* does not disclose combination classifier outputs and reliability indicators to classify items as set forth in independent claim 17, and therefore neither anticipates nor suggests the subject invention as recited in independent claim 17 (and claim 18 which depends there from). Accordingly, this rejection should be withdrawn.

Independent claim 19

Independent claim 19 is directed to a method of generating a classifier and recites a limitation of "applying a probabilistic approach that uses the training examples to develop a model that combines evidence to provide an output relating to whether an item belongs in a category ... ***wherein the evidence comprises one or more classical outputs of other classifiers and one or more attributes of the item other than the classical outputs of classifiers***". (emphasis added). As discussed previously, Gjerdingen *et al.* does not disclose the combination of classifier outputs and attributes to classify items as set forth in independent claim 19.

Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited

in independent claim 19 (and claims 20, 21, 22, 23 and 31 which depend there from), and this rejection should be withdrawn.

Independent claim 24

Independent claim 24 is directed to a method of classifying items and recites limitations of "applying probabilistic dependency models, one for each of a plurality of categories, to an item stored in computer readable format to provide an output relating to whether the item belongs in the category with respect to each of the plurality of categories; wherein ***the probabilistic dependency models collectively contain dependencies on outputs from a plurality of classifiers***." Gjerdingen *et al.* does not disclose the combination of classifier outputs to classify items, and therefore does not anticipate or suggest the subject invention as recited in the subject claim and those that depend there from – this rejection should be withdrawn.

Independent claim 27

Independent claim 27 is directed to a method of combining a plurality of classifiers to classify items and recites a limitation of "sequentially applying tests to the items to obtain test results... ***wherein the sequence of tests applied varies among the items in that the outcome of one or more tests affects whether another test is applied, whereby the classifiers utilized vary depending on the items***." (emphasis added). Gjerdingen *et al.* does not disclose or suggest one or more tests affecting whether another test is applied.

In view of at least the above, it is readily apparent that Gjerdingen, *et al.* neither anticipates nor suggests the subject invention as recited in independent claims 27 (and claim 28 which depends there from). Accordingly, this rejection should be withdrawn.

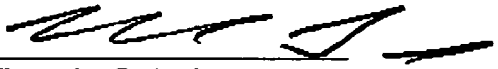
CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 (Ref. No. MSFTP217US).

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,
AMIN & TUROCY, LLP



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